FLAGSTAFF ENGINEERING

Tape Utility Software Documentation Manual

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FLAGSTAFF ENGINEERING

TAPE UTILITY

SOFTWARE DOCUMENTATION MANUAL

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INTRODUCTION

The Flagstaff Engineering Tape Utilities are menu driven programs that allow the user to exchange data files between the IBM PC/XT/AT and 1/2", 9 Track, Magnetic tape drives.

Six programs are included on the Tape Utility distribution diskette:

1. TAPEUTL.EXE
The program supports transfer of data files to and from ANSI unlabeled tape, or ANSI and IBM labeled tape. Tape block sizes of up to 64K bytes are supported, as well as the following software features.

* Allows complete control of the location on the tape to read or write data.

* Multiple DOS files may easily be concatenated onto one tape file.

* One tape file may be easily copied to multiple DOS volumes. For example, a tape file can be copied directly to diskettes.

* Multiple consecutive tape files may be copied to one DOS file.

* Fast, easy to use tape data display routine.

* Routines to support ANSI and IBM/OS labeled tapes.

* Translation routines between ASCII and EBCDIC files.

2. TAPEBKR.EXE
TAPEBKR is a backup/restore program that allows the user to store up to 1200 DOS files on tape for storage or backup purposes.

3. TAPETEST.EXE
TAPETEST is a tape system test and diagnostic program that allows the user to verify correct operation of the installed tape sub-system.

4. INSTAPE.EXE
INSTAPE is an installation program that allows the user to permanently set the screen display colors for the TAPEUTL program.

5. TAPEDUPE.EXE
TAPEDUPE is tape duplication program that requires the use of two tape drives on the system. The program will copy data from drive 0 to drive 1.

6. FLAGIO.SYS
FLAGIO.SYS is a software device driver that allows the programs to access the tape controller card. Installation procedure for this device driver is documented in the TAPE INSTALLATION GUIDE provided with the tape controller card. The device driver must be installed in the system to use any of the above programs.

IBM PC/XT/AT TAPE SYSTEM OVERVIEW

1. IBM PC/XT/AT computer and controller card.

The controller card interfaces between the software in the computer and the logic required by the tape formatter. The controller card used must "agree" with the software. That is, the tape controller card from one company will almost certainly not work with the software from another, since there is no standard.

2. Formatter and tape drive.

The formatter is the electronic (microprocessor based) interface between the host computer and the actual mechanical tape transport and tape heads etc. The formatter is located within the "tape drive".

3. Interface (cable) between the tape controller (in the PC) and the formatter (in the tape drive).

This is, in fact, two 50 conductor cables. Fortunately, the logic defined for this interface does follow a standard. Almost all small nine track, reel to reel tape drives implement the same logic and pin assignments for this interface.

SYSTEM REQUIREMENTS

The Tape Utilities require the following minimum system configuration for operation:

1. IBM PC, PC/XT, or PC/AT computer with a minimum of 256K of memory.

2. Flagstaff Engineering "CONNECTION" I/O device driver. (See the Tape Installation Guide for more information.)

3. Flagstaff Engineering "TAPE CONNECTION" tape controller card and cables.

4. 1600/3200 BPI, 9 track, 1/2" Mag tape drive with Pertec compatible interface signals (Pertec/Cipher formatter).

9-TRACK TAPE DEVICES OVERVIEW

This section is provided as a brief introduction to 9 track tape devices. On nine track tapes, data density is referred to as bits-per-inch (BPI). On 9 Track tapes, bits-per-inch and bytes-per-inch are in fact the same. An eight bit byte with a ninth parity bit is recorded across the tape with one bit being written to each track. This results in one byte being stored on 9 tracks. This is something of a simplification, particularly in the case of GCR recording, but is conceptually what happens.

A. Nine track tape recording methods.

The following types of data recording are in general use at the present time.

1. 800 bits per inch NRZI encoded. This is an older recording method and is not used extensively at the present time. Mechanically the requirements for this type of drive are more critical than for 1600 bit/inch PE recorders.

2. 1600 bit/inch PE (phase encoded). This recording method was used on mainframe computers for many years. Most mainframe tape systems are capable of reading and writing 1600 bpi tape.

3. 3200 bit/inch PE encoded. This is the same as 1600 bpi, but recorded at double density. Most mainframe systems will not recognize 3200 bpi tape.

TAPE FORMATS

Figure T1 - UNLABELED TAPE FORMAT

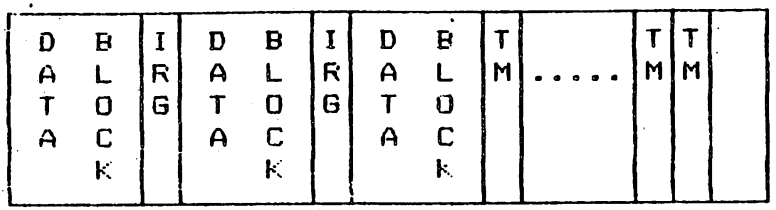

Figure T2 - LABELED TAPE FORMAT

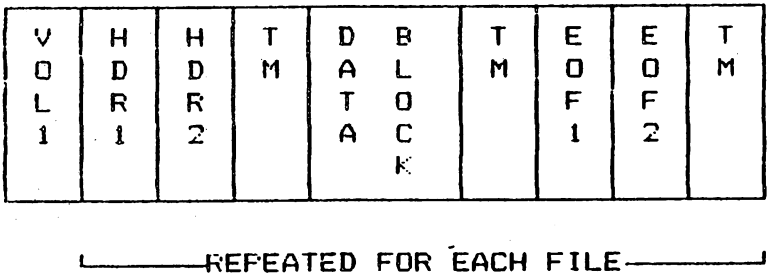

Diagram Abbreviations:

IRG - Inter-Record Gap
TM - Tape Mark
VOL1 - Volume Label
HDR1 - File Header Record #1
HDR2 - File Header Record #2
EOF1 - End Of File Record #1
EOF2 - End Of File Record #2

4. 6250 bit/inch GCR (group code recorded). This is probably the most commonly used recording method on most mainframe systems. These systems require extremely complex electronics and are much more expensive than the 1600 bpi systems.

B. Physical tape formats.

1. General description. (See Figure T1)

a. Data blocks. A data block is a continuous block of data recorded as a unit on the tape. It must be written as a unit, and in general, is also always read as a unit. Normally there are multiple logical records contained in a single data block on the tape.

b. InterRecord Gap (IRG). Following each data block or tape mark is a gap which is not recorded. This gap length is normally about .6 inch. On most tape drives there is an option to write tapes with longer gaps. This uses more tape to record the same data, and except in special cases, there is nothing to be gained from doing this.

c. Tape Marks (TM). At the end of each logical file on the tape is a tape mark. This is NOT data but is a special mark recorded and recognized by the tape formatter. Two tape marks with no intervening data blocks is recognized as the logical end of the tape. These are also referred to as "file marks".

2. Unlabeled tapes.

Unlabeled tapes consist of a series of data blocks followed by a tape mark. This sequence is repeated for each logical file on the tape, with the end of tape being indicated by two consecutive tape marks. Unlabeled tapes from some systems will also have a tape mark at the very beginning of the tape ahead of the first data block.

3. Labeled tapes. (See Figure T2)

a. VOL1 record. This is an 80 byte record which is always at the very beginning of a labeled tape. The only data contained in this record are the characters, 'VOL1', followed by the 6 character volume identifier. It is customary to use numeric digits for the id. Normally a tape is initialized only once by writing the VOL1 record. The tape is then used over and over without reinitializing the VOL1 record.

b. HDR1 record. This is an 80 byte record which contains the file name, file sequence number, creation date, etc. This is the first record of a labeled dataset.

c. HDR2 record. This is an 80 byte record which contains the data format (fixed, variable, etc.), logical record length, block length, etc.

d. Data. Following the HDR records, is a tape mark followed by the data blocks and then another tape mark.

e. EOF1 record. This is an 80 byte record which is the first of two end of file records that are written after a tape file. The EOF1 record is in the same format as the HDR1 record, with one exception. The EOF1 record contains an additional field that contains the actual number of blocks of data which were written in the file.

f. EOF2 record. This is an 80 byte record which is in the same format as the HDR2 record.

g. Following the EOF labels is another tape mark. If there is another file on the tape, the HDR1 record for the next file would immediately follow this tape mark. Otherwise there is a second tape mark which indicates logical end of tape.

ANSI and IBM/OS tape labels are very similar with the exception that ANSI labels are in ASCII code and IBM labels are in EBCDIC code. The label records are all 80 bytes long and contain only character data (no binary fields). In some cases there may be user defined HDR and EOF label records following the standard labels. If these are present, they are located after the standard HDR and EOF records and ahead of the tape marks which are normally right after the HDR2 and EOF2 records.

C. Beginning of tape - End of tape.

Near the beginning of a tape there is a reflective strip affixed to the top half of the tape. This is usually 10 - 15 feet from the beginning of the tape and is used by the tape transport to determine where to start writing on the tape (BOT).

Near the end of the tape there is a similar reflective strip affixed to the bottom half of the tape to indicate the end of tape (EOT). When the EOT reflective strip is detected, it is reported back to the software so that write operations can be terminated without running off the end of the tape.

d. Streaming Tapes.

The lower cost "streaming" tape drives are built with tape transports which are not capable of stopping the tape and then coming back up to read/write speed within the .6 inch interrecord gap (like "start-stop" tape drives). When these drives are required to stop, they must first stop the forward motion of the tape, and then reverse direction and reposition the tape to be ready to access the next data block for read or write. The process greatly reduces the overall speed of read/write operations.

When reading or writing data on streaming tape drives, the drive will maintain speed and continue to read or write the next block of data without stopping if the next read/write command is received from the host before the interrecord gap passes (i.e. it stays in streaming mode).

Hence, to get the best data transfer rate to or from a streaming drive, as much data as possible must be transferred without dropping out of streaming mode.

The TAPEUTL program allocates all available machine memory as a work buffer, after being loaded. The amount of memory available for use as a buffer directly affects the speed at which data can be transferred to or from streaming tape with the system. The larger the work buffer is, the more data may be transferred without dropping out of streaming mode.

PROGRAM OPERATION

Throughout this manual, keyboard entries are indicated by bracketed characters.

[ENTER] equals the enter key.
[Y] equals the Y key.

The Tape Utility programs may be copied to and executed from any diskette or hard disk volume desired.

To load the Tape Utility programs, use the standard PC-DOS load command syntax:

A:PROGRAM NAME

After a program has loaded, a copyright message will be displayed. The program will then calculate the amount of unused memory available in the system and allocate this memory as a work buffer.

The program then displays the main menu of commands. Specific menu commands are explained in each program section of the manual.

TAPEUTL.EXE

To load the TAPEUTL.EXE tape utility program, use the standard PC-DOS load command syntax:

```
A:TAPEUTL
```

After the program has loaded, the first help screen and a copyright message will be displayed. The program will then calculate the amount of unused memory available in the system and allocate this memory as a work buffer.

The program help screens may be paged through using the [PgUp] and [PgDn] keys, or the main menu may be displayed by pressing the [ESC] key.

After the main menu has been displayed, the program may be exited by pressing the [ESC] key. Sub menus may be exited by pressing the [ESC] key. When the [ESC] key is pressed in a sub menu, the program will exit the sub menu and return to the main menu.

Menu options are selected by typing the menu letter at the COMMAND: prompt, and then pressing the [ENTER] key. Each option will display a sub menu of commands.

Sub menu commands are selected by typing the command letter at the COMMAND: prompt, and then pressing enter.

Many sub menu commands display several entry fields that pertain to a given function. All entry fields should be filled in (most entry fields will be prefilled by default values when they are displayed).

The entry fields are submitted to the program routine by pressing the [ENTER] key. To complete the entry fields, use the [TAB] key to advance the cursor from entry to entry. [Shift] [TAB] will move the cursor to a previous entry field. Pressing the [TAB] key at the last entry field of the function will position the cursor at the first entry field of the function.

Sub menu commands and options may be exited by pressing the [ESC] key.

MENU COMMANDS

The Main Menu consists of the following commands:

A) PROCESS UNLABELED TAPES
B) PROCESS LABELED TAPES
C) REPOSITION TAPE OR DISPLAY RECORDS
D) CHANGE TAPE SYSTEM PARAMETERS

Each of these commands will display a sub menu of specific operations for the process selected. Commands are chosen by entering the appropriate command letter at the COMMAND: prompt followed by [ENTER].

Pressing the [ESC] key at the main menu COMMAND: prompt will end the program and return the user to PC-DOS.

OPTION (A) PROCESS UNLABELED TAPE

The unlabeled tape sub menu consists of the following commands:

A) COPY FILE FROM DISK TO TAPE
B) COPY FILE FROM TAPE TO DISK
C) REPOSITION TAPE OR DISPLAY RECORDS
D) COPY MULTIPLE FILES FROM TAPE TO DISK

These commands may be used for processing either ASCII or EBCDIC (IBM) unlabeled tapes.

COPY FILE FROM DISK TO TAPE
(UNLABELED TAPE COMMAND <A>)

Use this command to copy PC-DOS files to standard unlabeled tapes.

The tape must be positioned correctly before the data transfer is started. This allows the user to have complete control over where the data is placed on the tape (it also allows you to get in trouble if you really try).

At the completion of each transfer from DOS to tape, the user is allowed to enter another DOS file name and continue building to the same output tape dataset.

When the tape dataset is complete, the routine writes two tape marks (creating a logical end of tape) and then backspaces one tape mark. This insures that the tape always has a valid 'logical end of tape' and also leaves it positioned so that another file may be written to tape without repositioning the tape. The second tape mark is overwritten by the first data block, leaving one tape mark between the files.

Note that the data transfer routine takes care of writing the appropriate tape marks and you almost NEVER need to specifically use the 'write tape mark' function.

When specifying tape block sizes for tape output, the following items should be considered.

* Small block sizes are inefficient both in the use of the tape and in the time required to transfer data to and from them. For example, on 1600 bpi tape, a block size of 1000 bytes uses only 50% of the tape.

* Large block sizes are somewhat more prone to tape errors. Also if the tape is to be transferred to another system, be sure it can process the block size being created. Some systems will not process block sizes as large as this program is capable of creating.

PROMPT DESCRIPTIONS:

1. Translate data? ASCII to EBCDIC or the reverse translation may be specified.

2. Fixed length records. Data is transferred as fixed length records. If the DOS file length is not a multiple of the specified record length the user is given the option of transferring or not transferring the final partial record. Note that a partial record at the end of a fixed length file will cause most systems which expect to be processing fixed length records to choke. The following options may be specified.

a. Record size. Must be specified.

b. Records/tape block. This must result in a block size of less than 65536 bytes (64K).

c. Records to skip. This specifies the number of logical records to skip from the DOS file before starting to transfer data.

d. Records to transfer. This specifies the maximum number of records to be transferred to tape.

2. Variable length records. The data records on the DOS file are delimited by a specific character(s). The most common record delimiter is CR/LF (ØDh/ØAh). The records are padded out to the specified record length with blanks and written as fixed length records on the tape. The original delimiter bytes are NOT written to the tape. The entry for 'Line delimiter' specifies the characters which the routine will look for as record delimiter characters. Other options are the same as described for fixed length records, with the exception that the user is prompted for output block size, rather than records per block. The output block size may not exceed 64K characters.

3. String data. The data is transferred byte for byte from the DOS file to the tape. The following options may be specified.

a. Output tape block size. Must be less than 65536 bytes.

b. Characters to skip. Specifies how many characters to skip from the DOS file before starting data transfer.

c. Characters to transfer. Specifies the maximum number of characters to transfer to tape.

OPERATION:

Use the tape reposition command (C) to position the tape for writing a new file.

Enter [A] at the COMMAND: prompt. The program will display the following file specification prompts:

INPUT FILE NAME:
  DOS volume and file name
  to be copied to tape.

Enter the DOS volume, path, and file name for the file to be copied to tape.

TRANSLATE DATA:
  Copy data as is, convert
  EBCDIC to ASCII, or convert ASCII to
  EBCDIC.

Enter a [N] if no translation is required, otherwise enter an [E] for ASCII to EBCDIC translation, or enter an [A] for EBCDIC to ASCII translation.

DATA TYPE:
  Indicate data from input file is fixed
  length records, variable length records,
  or string data.

Enter [F] for fixed length records.
      [S] for string data.
      [V] for fixed length records
      created by removal of the carriage
      return/line feed characters from DOS
      variable records.

(F) Fixed length records: The program will output data to tape in fixed length records.

(S) String data: The program will output data to tape in the block size indicated. The data is read from the DOS file as a continuous string of data.

(V) Fixed length records: Fixed length output records generated from modified variable length records. Variable length records terminated by an indicated line delimiter (usually a carriage return/line feed) are read from the DOS input file. Fixed length records are created by deleting the line delimiter from the DOS record, and then padding the remaining positions of the fixed length record with blanks.

The program will display a transfer specification prompt based on the record type selected.

RECORD TYPE 'F' AND TYPE 'V' PROMPTS

For record type 'F' and 'V', the program will display the following entry fields:

RECORD SIZE:
  Logical record size used in the DOS file.

The maximum record length supported is 65536 (64K) bytes. Enter a number from 1 to 65536.

RECORDS PER OUTPUT TAPE BLOCK:
  The number of logical records to be included in each data block written to tape.

The maximum tape block supported is 65536 bytes, so if record size entered equaled 128 bytes, the maximum records per block would be 512 records. Enter a number from 1 to 65536 records per block.

RECORDS TO SKIP:
  The number of records to skip in the DOS input file before starting transfer.

This prompt allows a transfer to start at any record in the file. Enter the number of records to skip, or enter a [Ø] to begin transfer at start of file.

RECORDS TO TRANSFER:
  Number of records to be transferred from the DOS file.

Enter the number of records to be transferred, or enter [ALL] to transfer all records.

LINE DELIMITER:
  Hexadecimal character string that indicates the end of each record.

This prompt is only issued for Variable length records. Enter a string of hexadecimal values used to indicate end of record in the file. In ASCII text files, this is almost always a ØD ØA (carriage return/line feed).

The program will read data from the DOS file into the program buffer, and then write the entire buffer to tape.

The read to buffer, write to tape operation will continue until all data in the DOS file has been transferred to tape.

After the transfer is complete, the total number of bytes transferred will be displayed.

The user will be prompted to append another DOS file to the tape file being written. Enter a [Y] to append more DOS files to the tape output file, or press [ENTER] to continue.

After all additional files have been appended, or the append prompt is answered with [N], the program will write the file to Tape, and then move the cursor to the INPUT FILE NAME: prompt. Enter a file name to transfer, or press [ESC] to return to the unlabeled command menu.

RECORD TYPE 'S' PROMPTS

For record type 'S', the program will display the following entry fields:

OUTPUT TAPE BLOCK SIZE:
  Number of characters in each data block written to tape.

The maximum tape block size supported by the program is 65536 (64K) bytes. Enter a number from 1 to 65536 characters per block.

CHARACTERS TO SKIP:
  Number of characters to skip in the DOS file before starting transfer.

This prompt allows a transfer to start at any byte position in the file. Enter the number of characters to skip, or enter [Ø] to begin transfer at start of file.

CHARACTERS TO TRANSFER:
  Maximum number of characters to transfer.

Enter the number of characters to be transferred, or enter [ALL] to transfer all data.

TERMINATE ON EOF (X'1A') CHARACTER:
  Terminate the transfer on encountering ASCII EOF (end of file) character.

Enter [N] to transfer all data in the selected character range, or press [Y] to stop transferring data at EOF. An ASCII text file should be terminated when a hexadecimal '1A' is encountered.

Files with binary data, or program files could have many occurrences of hex '1A' throughout the file, so the [N] option should be chosen for these file types.

The program will read data from the DOS file into program buffer, and then write the entire buffer to tape.

The read to buffer, write to tape operation will continue until all data in the DOS file has been transferred to tape.

After the transfer is complete, the total number of characters transferred will be displayed.

The user will be prompted to append another DOS file to the tape file being written. Enter a [Y] to append more DOS files to the tape output file, or press [ENTER] to continue.

After all additional files have been appended, or the append prompt is answered by entering [N] or pressing [ENTER], the program will write the end of file blocks to tape, and then reposition the cursor at the INPUT FILE NAME prompt. Enter a DOS file name to transfer, or press [ESC] to exit the unlabeled tape sub menu.

Example: Disk To Tape (Unlabeled Tape).

```
COMMAND: [A]

INPUT FILE NAME [TEST.DAT]

TRANSLATE DATA? (N=NO, A=EBCDIC TO ASCII,
E = ASCII TO EBCDIC): [A]

DATA TYPE (F)IXED RECORDS, (V)ARIABLE
RECORDS, (S)TRING DATA  [F]

RECORD SIZE  [128]

RECORDS PER TAPE BLOCK: [1ØØ]

RECORDS TO SKIP  [Ø]

RECORDS TO TRANSFER [ALL]

1Ø BLOCKS 1ØØ28Ø BYTES TRANSFERRED

DO YOU WISH TO APPEND ANOTHER DOS FILE
(N/Y): [ENTER]

INPUT FILE NAME  [ESC]
COMMAND:
```

COPY FILE FROM TAPE TO DISK
(UNLABELED TAPE COMMAND <B>)

Use this command to copy unlabeled tape files to PC-DOS files.

The tape to DOS copy routines in the Flagstaff Engineering utility program do not arbitrarily reposition the tape. This allows the user to have full control over where data transfer is to start. If data is not be transferred in direct sequential order from the tape, the repositioning routines allow the user to position the tape at any tape mark or at any block within the tape dataset. The record display routine may be used to display the data, if necessary, before starting the data transfer. If the volume on which the output DOS file has been specified becomes full during the transfer, the program will close the file and allow a new file to be opened, then continue with the transfer. For example, a tape file may be transferred directly to multiple diskettes.

PROMPT DESCRIPTIONS:

1. Fixed length or string data?
Specifying fixed length means that the data records on the tape file are all exactly the same length. If this option is specified, the copy routine will abort if it finds a block on the tape which is not an exact multiple of the specified record length. Specifying string data allows the data from the tape to be copied byte for byte to a DOS file regardless of block length.

2. Translate data? This option may be used to specify that the data will be translated from ASCII to EBCDIC or the reverse.

3. Additional options to be specified for fixed length records.

a. Record length. The length of each logical record. Tape block length must be a multiple of record length.

b. Strip trailing blanks? Specifying yes will cause the input records to have trailing blanks truncated before being written out. This is usually used in conjunction with the insert line end characters option.

c. Insert line end characters? Specifying yes will cause line ending characters to be inserted after each input record. The most common line end characters are carriage return/line feed (ØDh/ØAh), but other line ending characters may be specified. Using this option along with strip trailing blanks and EBCDIC to ASCII conversion is a common way to convert fixed length record text files from a host computer into a PC text file.

d. Line end characters in hex. This option is significant only if insert line end characters have been specified for insertion. Up to to 1Ø characters may be specified as two hex digits per character with a blank between each character and the next.

e. Records to skip. If a number other than zero is entered here, then that number of records (of the length specified above) will be skipped from the input tape dataset before any data is transferred to the DOS file.

f. Records to transfer. If a number is specified here then that is the maximum number of records which will be transferred to the DOS file.

4. Additional options to be specified for string data transfer.

a. Characters to skip. If a number is entered here, it will cause that number of bytes to be skipped from the input tape dataset before any data is transferred to the DOS file.

b. Characters to transfer. If a number is specified here then that is the maximum number of characters which will be transferred to the DOS file.

OPERATION:

If necessary, use the tape reposition command (C) to position the tape at the beginning of the tape file to be transferred.

Enter [B] at the COMMAND: prompt. The program will display the following file specification prompts:

OUTPUT DOS FILE NAME:
  DOS file name to be copied to tape.

Enter the DOS volume, path, and file name for the tape file to be copied to.

FIXED LENGTH RECORDS OR STRING DATA :
Indicate that data in the tape file is fixed length records or string data.

Enter [F] for fixed length records.
[S] for string data.

(F) Fixed length records: The program will read data from a tape file as fixed length records.

(S) String data: The program will read data from a tape file as a continuous string of data.

TRANSLATE DATA: Copy data as is, convert EBCDIC to ASCII, or convert ASCII to EBCDIC.

Enter a [N] or if no translation is required, otherwise enter an [E] for ASCII to EBCDIC translation, or enter an [A] for EBCDIC to ASCII translation.

The program will display a transfer specification prompt based on the record type selected.

RECORD TYPE 'F' PROMPTS

For record type 'F', the program will display the following entry fields:

RECORD LENGTH:
Logical record size used in the tape file.

Enter the record length used in the tape file. The maximum record length supported is 65536 (64K) bytes.

STRIP TRAILING BLANKS:
  Strip trailing blanks from each record.

Enter a [Y] at this prompt to remove trailing blanks from fixed length tape records. This would generally be done when the tape file is a text file that has had records padded out with blanks.

INSERT LINE END:
  Create end of line characters in DOS output file.

Enter a [Y] to this prompt to create a DOS file with fixed or variable length records terminated by a particular hexadecimal string. The line end sequence is usually hex 'ØD ØA' (carriage return/line feed). Any end of line sequence desired may be entered at this prompt.

LINE END CHARACTERS:
  Hexadecimal character string that indicates the end of each record.

Enter a string of hexadecimal values used to indicate end of record in the DOS output file. In ASCII text files, this is almost always a 'ØD ØA' (carriage return/line feed).

RECORDS TO SKIP:
  The number of records to skip in the tape input file before starting transfer.

This prompt allows a transfer to start at any record in the tape input file. Enter the number of records to skip, or enter a [Ø] to begin transfer at start of file.

RECORDS TO TRANSFER:
  Number of records to be transferred from the tape file.

This prompt allows any number of records to be transferred from the tape file to a DOS file. Enter the number of records to be transferred, or enter [ALL] to transfer all records.

The program will read data from the tape file into the program buffer, and then write the entire buffer to the DOS file.

The read to buffer, write to DOS file operation will continue until all indicated data in the tape file has been transferred to the DOS file.

After the transfer is complete, the total number of bytes transferred will be displayed.

The user will be prompted to press any key to continue. This pause is provided so that the number of bytes transferred can be read. Press any key to end the pause. The program will exit the tape to disk sub menu, and return to the unlabeled tape command menu.

RECORD TYPE 'S' PROMPTS

For record type 'S', the program will display the following entry fields:

CHARACTERS TO SKIP:
  Number of characters to skip in the tape file before starting transfer.

This prompt allows a transfer to start at any byte position in the tape file. Enter the number of characters to skip, or enter [Ø] to begin transfer at start of file.

CHARACTERS TO TRANSFER:
  Maximum number of characters to transfer.

This prompt allows any number of characters to be transferred from the tape input file. Enter the number of characters to be transferred, or enter [ALL] to transfer all data.

The program will read data from the tape file into the program buffer, and then write the entire buffer to the DOS file.

The read to buffer, write to DOS file operation will continue until all indicated data in the tape file has been transferred to the DOS file.

After the transfer is complete, the total number of bytes transferred will be displayed. The user will be prompted to press any key to continue. This pause is provided so that the number of bytes transferred can be read. Press any key to end the pause. The program will exit the tape to disk sub menu, and return to the unlabeled tape command menu.

```
Example: Tape to Disk  <Unlabeled Tape>.

COMMAND: [B]

OUTPUT DOS FILE  [C:\TEMP\TEST.DAT]

FIXED LENGTH RECORDS,
OR STRING DATA (F/S) [F]

TRANSLATE DATA? (N=NO, A=EBCDIC TO ASCII,
E = ASCII TO EBCDIC): [E]

RECORD SIZE  [128]

SKIP TRAILING BLANKS (Y/N) [N]

INSERT LINE END (Y/N) [Y]

LINE END CHARACTERS IN HEX  [ØD ØA]

RECORDS TO SKIP [Ø]

RECORDS TO TRANSFER [ALL]

COPY COMPLETE - 1ØØ28Ø BYTES TRANSFERRED
PRESS ANY KEY TO CONTINUE  [ENTER]

COMMAND:
```

REPOSITION TAPE OR DISPLAY RECORDS (UNLABELED TAPE COMMAND <C>)

The sub menu displayed by this command is exactly the same as displayed by Main Menu Option <C>. This command/option is documented in the Main Menu Option <C> section of the manual (Pg. 2.45).

COPY MULTIPLE FILES FROM TAPE TO DISK (UNLABELED TAPE COMMAND <D>)

Use this command to copy ALL tape files from the current location on tape to the logical end of tape.

Several consecutive tape datasets may be transferred to a single DOS file with this operation. The number of tape datasets to be transferred must be entered. If logical end of tape is encountered before transferring the requested number, the function will terminate.

The prompts for this command are exactly the same as displayed by the Unlabeled Tape to Disk command with one exception. An additional prompt is displayed prior to transfer. The prompt will be displayed as:

NUMBER OF FILES TO TRANSFER

Enter [ALL] to transfer all files from the current tape position to end of tape to a single DOS file. Enter up to a four digit number to transfer a required number of files to a single DOS file.

OPTION (B) - PROCESS LABELED TAPE

The labeled tape sub menu consists of the following commands:

A) COPY FILE FROM DISK TO TAPE
B) COPY FILE FROM TAPE TO DISK
C) LIST FILES ON THE TAPE
D) SPACE TO LOGICAL END OF TAPE
E) INITIALIZE THE TAPE
F) REWIND

These commands may be used for processing either ANSI standard or IBM labeled tapes.

COPY FILE FROM DISK TO TAPE
(LABELED TAPE COMMAND <A>)

Use this command to copy PC-DOS files to ANSI or IBM standard labeled tapes.

If a labeled tape is mounted (or has just been initialized), when this routine is entered the tape will be positioned correctly to write file number 1 on the tape. If the tape contains one or more files already which are to be retained, then it needs to be repositioned to 'logical end of tape' before writing the file. This can be done by selecting the 'space forward to logical end of tape' function before entering the 'disk to labeled tape' function or by specifying 'END' for the position option. A tape name prompt is displayed. If none is entered it will default to the root name of the DOS input file specified. Other prompts are as described for unlabeled tapes. As with unlabeled tapes, at the completion of the transfer the tape is correctly positioned to transfer another file without repositioning the tape.

OPERATION:

Enter [A] at the COMMAND: prompt. The program will position the tape at the beginning of the first file on the tape and display the tape volume label if found. A prompt will be displayed to reposition the tape. Four repositioning options are supported:

(C)urrent.
  Leave tape at current position.
(file number)
  Position tape at the beginning of the file number entered.
(file name)
  Position tape at the beginning of the file name entered.
(E)nd.
  Position tape at logical end of tape.

Enter [C] to leave the tape at the current tape position.

Enter [E] to position the tape at the logical end of tape (end of last written file).

Enter [file number] (up to four digits) to position the tape at the beginning of a particular file number. This file will be overwritten by the copy process, and ALL files occurring on tape beyond this position will be considered deleted.

Enter [file name] to position the tape at the beginning of a particular file name. This file will be overwritten by the copy process, and ALL files occurring on tape beyond this position will be considered deleted.

(Use the [C] command to display file number and name of all files on the labeled tape.)

Enter the desired repositioning command. The program will reposition the tape and display a file specification prompt consisting of the following field entries:

INPUT FILE NAME: DOS volume and file name to be copied to tape.

Enter the DOS volume, path, and file name for the file to be copied to tape.

TAPE NAME:
Name of the tape output file.

Enter the file name to be written in the tape file HDR1 block. If this entry is left blank, the DOS input file name will be used. The extension on the DOS file name will be discarded.

TRANSLATE DATA:
Copy data as is, convert EBCDIC to ASCII, or convert ASCII to EBCDIC.

Enter a [N] or if no translation is required, otherwise enter an [E] for ASCII to EBCDIC translation, or enter an [A] for EBCDIC to ASCII translation.

DATA TYPE:
Indicate data from input file as fixed length records, variable length records, or string data.

Enter [F] for fixed length records.
[S] for string data.
[V] for fixed length records created by removal of the carriage return/line feed characters from DOS variable records.

(F) Fixed length records: The program will output data to tape in fixed length records.

(S) String data: The program will output data to tape in the block size indicated. The data is read from the DOS file as a continuous string of data.

(V) Fixed length records: Fixed length output records generated from modified variable length records.

Variable length records terminated by an indicated line delimiter (usually a carriage return/line feed) are read from the DOS input file. Fixed length records are created by deleting the line delimiter from the DOS record, and then padding the remaining positions of the fixed length record with blanks.

The program will display a transfer specification prompt based on the record type selected.

RECORD TYPE 'F' AND TYPE 'V' PROMPTS

For record type 'F' and 'V', the program will display the following entry fields:

RECORD SIZE:
Logical record size used in the DOS file.

The maximum record length supported is 65536 (64K) bytes. Enter a number from 1 to 65536.

RECORDS PER OUTPUT TAPE BLOCK:
The number of logical records to be included in each data block written to tape.

The maximum tape block supported is 65536 bytes, so if record size entered equaled 128 bytes, the maximum records per block would be 512 records. Enter a number from 1 to 65536 records per block.

RECORD TO SKIP:
The number of records to skip in the DOS input file before starting transfer.

This prompt allows a transfer to start at any record in the file. Enter the number of records to skip, or enter a [Ø] to begin transfer at start of file.

RECORDS TO TRANSFER:
Number of records to be transferred from the DOS file.

Enter the number of records to be transferred, or enter [ALL] to transfer all records.

LINE DELIMITER:
Hexadecimal character string that indicate the end of each record.

Enter a string of hexadecimal values used to indicate end of record in the file. In ASCII text files, this is almost always a ØD ØA (carriage return/line feed).

The program will read data from the DOS file into the program buffer, and then write the entire buffer to tape. The read to buffer, write to tape operation will continue until all data in the DOS file has been transferred to tape.

After the transfer is complete, the total number of bytes transferred will be displayed.

The user will be prompted to append another DOS file to the tape file being written. Enter a [Y] to append more DOS files to the tape output file, or press [ENTER] to continue.

After all additional files have been appended, or the append prompt is answered with [N], the program will write the file to Tape, and then move the cursor to the INPUT FILE NAME: prompt. Enter a file name to transfer, or press [ESC] to return to the labeled command menu.

RECORD TYPE 'S' PROMPTS

For record type 'S', the program will display the following entry fields:

OUTPUT TAPE BLOCK SIZE:
Number of characters in each data block written to tape.

The maximum tape block size supported by the program is 65536 (64K) bytes. Enter a number from 1 to 65536 characters per block.

CHARACTERS TO SKIP:
Number of characters to skip in the DOS file before starting transfer.

This prompt allows a transfer to start at any byte position in the file. Enter the number of characters to skip, or enter [Ø] to begin transfer at start of file.

CHARACTERS TO TRANSFER:
  Maximum number of characters to transfer.

Enter the number of characters to be transferred, or enter [ALL] to transfer all data.

TERMINATE ON EOF (X'1A') CHARACTER:
  Terminate the transfer on encountering ASCII EOF (end of file) character.

Enter [N] to transfer all data in the selected range, or press [Y] to stop transferring data at EOF. An ASCII text file should be terminated when a hexadecimal '1A' is found. Files with binary data, or program files, could contain many occurrences of hex '1A' in the file, so the [N] option should be chosen for these file types.

The program will read data from the DOS file into the program buffer, and then write the entire buffer to tape. The read to buffer, write to tape operation will continue until all data in the DOS file has been transferred to tape.

After the transfer is complete, the number characters transferred will be displayed.

The user will be prompted to append another DOS file to the tape file being written. Enter a [Y] to append more DOS files to the tape output file, or press [ENTER] to continue.

After all additional files have been appended, or the append prompt is answered by entering [N] or pressing [ENTER], the program will write the end of file blocks to tape, and then reposition the cursor at the INPUT FILE NAME prompt. Enter a DOS file name to transfer, or press [ESC] to exit the Labeled tape sub menu.

Example: Disk To Tape (Labeled Tape).

COMMAND: [A]

TAPE POSITION (C)urrent/file#/filename /(E)nd [C]

ENTER FILE NAME [TEST.DAT]

TRANSLATE DATA? (N=NO, A=EBCDIC TO ASCII, E = ASCII TO EBCDIC): [A]

DATA TYPE (F)IXED RECORDS, (V)ARIABLE RECORDS, (S)TRING DATA [F]

RECORD SIZE [128]

RECORDS PER TAPE BLOCK: [100]

RECORDS TO SKIP [0]

RECORDS TO TRANSFER [ALL]

10 BLOCKS 100280 BYTES TRANSFERRED

DO YOU WISH TO APPEND ANOTHER DOS FILE (N/Y): [ENTER]

ENTER FILE NAME [ESC]

COMMAND:

COPY FILE FROM TAPE TO DISK
(LABELED TAPE COMMAND <B>)

Use this command to copy labeled tape files to PC-DOS files.

After the labeled tape routine has been entered, the first request to copy data from or to the tape will cause the tape to be rewound and the volume label read and checked. The type and id of the volume label are displayed and the tape is left positioned at the HDR1 label for the first file on the tape.

If a valid label is not found, the function is rejected. If the first (or only) dataset is to be copied from the tape, then no repositioning is required before starting the copy function. If data must be transferred from a labeled tape which has a format that is not recognized by this program, it may usually be done using the unlabeled routines.

The repositioning and dump data to screen commands may be used to locate the data, then the unlabeled routines may be used to transfer it to a DOS file. The actual data will usually be right after either the first or second tape mark on the tape. Whether the data is fixed or string (undefined as far as the tape label is concerned) and the logical record length for fixed length records is obtained from the header records for the file. These values are displayed on the screen as default values. They may be overridden by the user if desired. The remaining prompts are the same as those for unlabeled tapes.

OPERATION:

Enter [B] at the COMMAND: prompt. The program will position the tape at the beginning of the first file on the tape and display the tape volume label if found. A prompt will be displayed to reposition the tape. Four repositioning options are supported:

(C)urrent.
  Leave tape at current position.
(file number)
  Position tape at the beginning of the file number entered.
(file name)
  Position tape at the beginning of the filename entered.
(E)nd.
  Position tape at logical end of tape.

Enter [C] to leave the tape at the current tape position.

Enter [E] to position the tape at the logical end of tape (end of last written file).

Enter [file number] (up to four digits) to position the tape at the beginning of a particular file number. This file will be overwritten by the copy process, and ALL files occurring on tape beyond this position will be considered deleted.

Enter [file name] to position the tape at the beginning of a particular file name. This file will be overwritten by the copy process, and ALL files occurring on tape beyond this position will be considered deleted.

(Use the [C] command to display file number and name of all files on the labeled tape.)

Enter the desired repositioning command. The program will reposition the tape and display a file specification prompt consisting of the following field entries:

OUTPUT DOS FILE:
DOS file name to be copied to tape.

This prompt will be filled in by using the tape file name found in the tape file HDR1 block. To use a different target name, add an extension, or indicate a subdirectory, enter the DOS volume, path, and file name for the tape file to be copied to.

FIXED LENGTH RECORDS OR STRING DATA:
Indicate that data in the tape file is fixed length records or string data.

The program will determine the record type used by reading the tape file HDR1 block and prefilling this entry field with:

[F] for fixed length records.
[S] for string data.

(F) Fixed length records: The program will read data from a tape file as fixed length records.

(S) String data: The program will read data from a tape file as a continuous string of data.

TRANSLATE DATA: Copy data as is, convert EBCDIC to ASCII, or convert ASCII to EBCDIC.

Enter a [N] if no translation is required, otherwise enter an [E] for ASCII to EBCDIC translation, or enter an [A] for EBCDIC to ASCII translation.

The program will display a transfer specification prompt based on the record type selected.

RECORD TYPE 'F' PROMPTS

For record type 'F', the program will display the following entry fields:

RECORD LENGTH:
Logical record size used in the tape file.

The program will prefill the entry field by reading the record size from the HDR1 block of the tape file. The maximum record length supported is 65536 (64K) bytes. (Note* the programs default read buffer size is 16K. If tape blocks exceed this size, use the Change System Parameter sub menu to set the tape input read buffer to a size equal or greater than the largest tape block size.)

STRIP TRAILING BLANKS:
Strip trailing blanks from each record.

Enter a [Y] at this prompt to remove trailing blanks from fixed length tape records. This would generally be done when the tape file is a text file that has had records padded out with blanks.

INSERT LINE END:
Create end of line characters in DOS output file.

Enter a [Y] to this prompt to create a DOS file with fixed or variable length records terminated by a particular hexadecimal string. The line end sequence is usually hex 'ØD ØA' (carriage return/line feed). Any end of line sequence desired may be entered at this prompt.

LINE END CHARACTERS:
  Hexadecimal character string that indicates the end of each record.

Enter a string of hexadecimal values used to indicate end of record in the DOS output file. In ASCII text files, this is almost always a 'ØD ØA' (carriage return/line feed).

RECORDS TO SKIP:
  The number of records to skip in the tape input file before starting transfer.

This prompt allows a transfer to start at any record in the tape input file. Enter the number of records to skip, or enter a [Ø] to begin transfer at start of file.

RECORDS TO TRANSFER:
  Number of records to be transferred from the tape file.

This prompt allows any number of records to be transferred from the tape file to a DOS file. Enter the number of records to be transferred, or enter [ALL] to transfer all records.

The program will read data from the tape file into the program buffer, and then write the entire buffer to the DOS file.

The read to buffer, write to DOS file operation will continue until all indicated data in the tape file has been transferred to the DOS file.

After the transfer is complete, the total number of bytes transferred will be displayed.

The user will be prompted to press any key to continue. This pause is provided so that the number of bytes transferred can be read. Press any key to end the pause. The program will exit the tape to disk sub menu, and return to the unlabeled tape command menu.

RECORD TYPE 'S' PROMPTS

For record type 'S', the program will display the following entry fields:

CHARACTERS TO SKIP:
  Number of characters to skip in the tape file before starting transfer.

This prompt allows a transfer to start at any byte position in the tape file. Enter the number of characters to skip, or enter [Ø] to begin transfer at start of file.

CHARACTERS TO TRANSFER:
  Maximum number of characters to transfer.

This prompt allows any number of characters to be transferred from the tape input file. Enter the number of characters to be transferred, or enter [ALL] to transfer all data.

The program will read data from the tape file into the program buffer, and then write the entire buffer to the DOS file.

The read to buffer, write to DOS file operation will continue until all indicated data in the tape file has been transferred to the DOS file.

After the transfer is complete, the total number of bytes transferred will be displayed. The user will be prompted to press any key to continue. This pause is provided so that the number of bytes transferred can be read. Press any key to end the pause. The program will exit the tape to disk sub menu, and return to the labeled tape command menu.

Example: Tape to Disk <Labeled Tape>.

```
COMMAND: [B]

TAPE POSITION (C)urrent/file#/filename
/(E)nd [C] [ENTER]

OUTPUT DOS FILE  [C:\TEMP\TEST.DAT]

FIXED LENGTH RECORDS,
OR STRING DATA (F/S) [F]

TRANSLATE DATA? (N=NO, A=EBCDIC TO ASCII,
E = ASCII TO EBCDIC): [E]

RECORD SIZE  [128]

SKIP TRAILING BLANKS (Y/N) [N]

INSERT LINE END (Y/N) [Y]

LINE END CHARACTERS IN HEX  [ØD ØA]

RECORDS TO SKIP [Ø]

RECORDS TO TRANSFER [ALL]

COPY COMPLETE - 1ØØ28Ø BYTES TRANSFERRED
PRESS ANY KEY TO CONTINUE  [ENTER]

COMMAND:
```

LIST DATASETS ON THE TAPE
(LABELED TAPE COMMAND <C>)

Use this command to list all datasets written on the labeled tape.

The command will display a file information line for each dataset on the tape. The information line will include file number, name, record type where F = fixed, U = undefined (string data), block size, record size, and total number of blocks in the file.

Example:

COMMAND: [C] [ENTER]

SEQ	NAME	TYPE	BLOCK SIZE	RECORD SIZE	NUMBER BLOCKS
1	TESTFILE	F	256	128	11
2	DATA123	F	192Ø	8Ø	37
3	TEXTFILE	U	4Ø96		1Ø

SPACE TO END OF TAPE
(LABELED TAPE COMMAND <D>)

Use this command to forward space to the logical end of tape.

When the command is executed, the program will search the tape until the last file and double tape mark is found. The program will then halt the tape drive.

This command should be run before writing a new file to a labeled tape to insure that existing files will not be overwritten by new files.

Enter [D]. The program will perform the function and then display, LOGICAL END OF TAPE FOUND.

Example:

COMMAND: [D] [ENTER]

LOGICAL END OF TAPE FOUND

INITIALIZE A LABELED TAPE
(LABELED TAPE COMMAND <E>)

Use this command to create a volume label and initialize a labeled tape for use.

Enter [E] at the COMMAND: prompt. The program will display the following initialization prompts:

TYPE OF LABEL TO CREATE - (A)NSI OR (I)BM:
  Create either an ANSI or IBM volume label.

Enter an [A] for ANSI, or an [I] for IBM labeled tapes.

VOLUME ID (6 CHARACTERS):
  Labeled tape volume name.

Enter up to six alphanumeric characters for the volume ID. If a volume ID is not entered, the volume label created will be blank. A default volume ID is not generated.

ERASE TO END OF TAPE:
  Erase the remainder of the tape after writing the volume label.

New tapes should be erased to end of tape to condition the tape. If this option is selected, the process will take several minutes to complete. Enter a [Y] for yes, or [N] for no.

Example:

```
COMMAND: [E] [ENTER]

TYPE OF LABEL TO CREATE: ANSI OR IBM
(A/I): [A]

VOLUME ID (6 CHARACTERS)  [MYVOL]

ERASE TO END OF TAPE (N/Y): [N]

TAPE VOLUME LABEL WRITTEN

COMMAND:
```

REWIND
(LABELED TAPE COMMAND <F>)

Use this command to rewind a labeled tape to the beginning of the first file.

Enter [F] at the COMMAND: prompt. The program will rewind the tape. The program will identify the tape as an ANSI or IBM labeled tape, and display the volume label.

Example:

COMMAND: [F] [ENTER]

TAPE IS ANSI LABELED VOLUME MYVOL

COMMAND:

OPTION (C) - REPOSITION TAPE
OR DISPLAY RECORDS

The tape reposition and display sub menu consists of the following command:

A) FORWARD SPACE FILES
B) BACK SPACE FILES
C) FORWARD SPACE BLOCKS
D) BACK SPACE BLOCKS
E) SPACE TO LOGICAL END OF TAPE
F) REWIND
G) REWIND AND UNLOAD
H) WRITE TAPE MARK
I) DISPLAY TAPE RECORD ON SCREEN
J) ERASE TO END OF TAPE

These commands should be used to determine block sizes and file positions of unlabeled tape files prior to executing the unlabeled tape commands.

FORWARD SPACE FILES (TAPE MARKS)
(REPOSITION/DISPLAY COMMAND <A>)

Use this command to forward space xx number of files on an unlabeled tape.

Each file on an unlabeled tape ends with a tape mark. This command will space the tape forward the number of tape marks specified. If no number is entered, the tape is spaced one file mark. After the completion of this command the tape is positioned immediately after a file mark.

Enter [A] [xx] at the COMMAND: prompt. After the operation has been completed, the program will display the message, FORWARD SPACE FILE COMPLETE. The tape will be positioned at the first block of the next file. The next file may be dumped or overwritten by a new file.

Example:

COMMAND: [A] [1Ø] [ENTER]

FORWARD SPACE FILE COMPLETE

COMMAND:

BACK SPACE FILES (TAPE MARKS)
(POSITION/DISPLAY COMMAND <B>)

Use this command to back space xx number of files on an unlabeled tape.

When the command is executed, the program will backspace the tape past the start of the file the tape was positioned on when the command was executed. The program will continue to backspace the tape past the indicated number of files or until BOT (load point) is found. The tape will then be forward spaced one tape mark. This will set the tape at the correct position to copy the file to disk, or display the first block of the file.

Assume a tape with four files occurring sequentially as file 'A', 'B', 'C', and 'D', with the tape positioned in a block of file 'D'. A [B 2] command would cause the program to backspace the tape to the first data block of file 'C'.

Enter [B] [xx] at the COMMAND prompt. After the operation has been completed, the program will display the message, BACKWARD SPACE FILE COMPLETE.

Example:

COMMAND: [B] [2] [ENTER]

BACKWARD SPACE FILE COMPLETE

COMMAND:

FORWARD SPACE BLOCKS
(POSITION/DISPLAY COMMAND <C>)

Use this command to forward space xx number of blocks in a file.

Each file on an unlabeled tape is composed of data logical blocks. The FSB command will forward space the tape the indicated number of blocks, or until an end of file mark (tape mark) is encountered. If an end of file mark is found, the program will abort the operation and display the message, FILE MARK FOUND.

Enter [C] [xx] at the COMMAND prompt. On successful completion of the command, the program will display the message, FORWARD SPACE BLOCKS COMPLETE. The tape will be positioned at the next block of the file. The next block of the file may be dumped with the display command <I>, or the remainder of the file may be transferred with the copy unlabeled tape to disk command. The remainder of the file may also be overwritten by new data.

Example:

COMMAND: [C] [7]

FORWARD SPACE BLOCK COMPLETE

COMMAND:

BACK SPACE xx BLOCKS
(POSITION/DISPLAY COMMAND <D>)

Use this command to back space xx number of blocks in a file.

The program will backspace the tape until the indicated number of data blocks have been found, or an end of file mark (tape mark) is encountered. If an end of file mark is found, the program will abort the operation and display the message, FILE MARK FOUND. After the backspace operation has been completed, the tape will then be forward spaced past the file mark. This will position the tape to read the first data block of a file.

Enter [D] [xx] at the COMMAND prompt. On successful completion of the command, the program will display the message, BACKWARD SPACE BLOCKS COMPLETE. The tape will be positioned at the block of the file backspaced to. The block may be dumped or overwritten by a new file.

Example:

COMMAND: [D] [1Ø] [ENTER]

BACK SPACE BLOCK COMPLETE

COMMAND:

SPACE TO LOGICAL END OF TAPE
(POSITION/DISPLAY COMMAND <E>)

Use this command to forward space to the logical end of tape.

Each file on an unlabeled tape is ended with a tape mark. After the last file is written, a second tape mark is written to tape. This double tape mark indicates the end of data files on the tape.

The command causes the program to forward space the tape until the double tape marks indicating logical end of tape are found. After the double tape marks are found, the tape will be positioned between the two tape marks. This tape position is the correct position for adding new files to the tape with the unlabeled disk to tape option. New files may now be added to the tape without overwriting existing files.

Enter [E] at the COMMAND: prompt. The program will forward space the tape until a double tape mark is found, and then display, LOGICAL END OF TAPE FOUND.

Example:

COMMAND: [E]

LOGICAL END OF TAPE FOUND

COMMAND:

REWIND TAPE
(POSITION/DISPLAY COMMAND <F>

Use this command to rewind the tape back to the tape Load Point (the Load Point is indicated by the reflective strip at the beginning of the tape). The first file on the tape may now be dumped, or written over by a new file. This function may be aborted by pressing the ESC key.

Enter [F] at the COMMAND: prompt. The program will rewind the tape and display the message, TAPE IS AT LOAD POINT.

Example:

COMMAND: [F] [ENTER]

TAPE IS REWINDING, PLEASE WAIT
TAPE IS AT LOAD POINT

COMMAND:

REWIND AND UNLOAD
(POSITION/DISPLAY COMMAND <G>)

Use this command to completely rewind and unload the tape from the drive.

Enter [G] at the COMMAND prompt. The program will rewind and unload the tape after displaying the message, UNLOAD INITIATED.

Example:

COMMAND: [G] [ENTER]

UNLOAD INITIATED

COMMAND:

WRITE TAPE MARK
(POSITION/DISPLAY COMMAND <H>)

This command will create a tape mark at the current position on the tape.

This command is seldom used. The disk to tape routines write their own tape marks at the end of data transfer. The command could be used to create an end of file mark in the middle of a existing tape file.

Enter [H] at the COMMAND prompt. The program will create a tape mark on the tape and then display the message, TAPE MARK WRITTEN.

Example:

COMMAND: [H] [ENTER]

TAPE MARK WRITTEN

COMMAND:

DISPLAY TAPE RECORD ON SCREEN (POSITION/DISPLAY COMMAND <I>)

Use this command to display data from tape to screen.

Enter [I] at the COMMAND: prompt. The program will read the data block the tape is positioned on and display the first 32Ø bytes of data on the screen. The offset into the block, a hex representation of the data, and either an ASCII or EBCDIC interpretation of the data will be displayed. When entering the display routine, it checks to see if there are more valid ASCII or EBCDIC characters, then goes with the majority.

The data display will display a complete tape block on the screen. If the block size exceeds the display area, the display will halt and wait for input.

The data will be displayed on the screen as information lines of sixteen hexadecimal values. To the right of each information line is a translation of the data represented in ASCII or EBCDIC. The translation being used is displayed at the upper right corner of the screen. The display may be toggled between EBCDIC and ASCII displays by pressing the [F1] key.

The following keys are recognized by the display routine:

PgUp - Display previous screen of data from this block.

PgDn - Display next screen of data from this block.

Home - Display previous block from the tape.

End - Display next block from the tape.

UpArrow - Scroll the screen up one line.

DownArrow - Scroll the screen down one line.

F1 - Toggle character display between ASCII and EBCDIC.

ESC - Exit the dump routine.

Command line entries may be as follows:

nnn... Display data starting at the specified decimal offset into the block.

Bnnn.. Display the specified block number within the file. (Note that the routines may loose track of the correct block number within the file if you forward space to a tape mark then back space records into the file.)

Example:

COMMAND: [I] [ENTER]

```
DISP          HEX DATA                  ASCII

 Ø   3Ø 3Ø 38 .........54 4F 5Ø ;ØØ8..TOP;
                                 ;........;
16   2Ø 2Ø 2Ø .........2Ø 2Ø 2Ø ;        ;
                                 ;........;
32   2Ø 2Ø 2Ø .........2Ø 2Ø 2Ø ;        ;
                                 ;........;
48   3Ø 39 39 .........3Ø 39 2Ø ;Ø99..Ø9 ;
```

COMMAND: BLOCK 1 LENGTH 5ØØ

COMMAND: [B15] [ENTER]

```
DISP          HEX DATA                  ASCII

 Ø   31 32 33 .........41 42 43 ;123..ABC;
                                 ;........;
16   2Ø 2Ø 2Ø .........2Ø 2Ø 2Ø ;        ;
                                 ;........;
32   2Ø 2Ø 2Ø .........2Ø 2Ø 2Ø ;        ;
                                 ;........;
48   32 32 35 .........3Ø 39 2Ø ;225..Ø9 ;
```

COMMAND: BLOCK 15 LENGTH 5ØØ

[ESC]

COMMAND:

ERASE TO END OF TAPE
(POSITION/DISPLAY COMMAND <J>)

Use this command to erase all data to end of tape.

This command is seldom used, unless classified data needs to be physically removed from a tape. This command will erase all data starting from the position the tape is at when the command is executed.

Enter [J] at the COMMAND: prompt. The program will perform the function and then display, ERASE TO END OF TAPE COMPLETE.

Example:

COMMAND: [J] [ENTER]

ERASE TO END OF TAPE COMPLETE

COMMAND:

OPTION (D) CHANGE TAPE SYSTEM PARAMETERS

The tape system parameter option is designed to allow program operation parameters to be changed by the user.

When the command is executed, the program will display a sub menu of the following commands:

A) SET LOW TAPE SPEED
B) SET HIGH TAPE SPEED
C) SET SHORT INTER-RECORD GAP FOR WRITE (DEFAULT)
D) SET LONG INTER-RECORD GAP FOR WRITE
E) SET ERROR RETRY COUNT (DEFAULT = 16)
F) SET TAPE ADDRESS (Ø = DEFAULT)
G) SET 16ØØ BITS/INCH DENSITY (DEFAULT)
H) SET 32ØØ BITS/INCH DENSITY
I) SET MAXIMUM BUFFER SIZE FOR READ (DEFAULT = 16K)

TAPE SPEED:

Not all tape drives will respond to speed change commands. The speed at which the tape drive is operating at power up may be dependent on dip switch or jumper options which are set on the tape drive. Do not attempt to operate an IBM/AT with a data rate above 1ØØk bytes/sec. On a 16ØØ bpi tape a speed of 5Ø inches per second produces a data rate of 8Øk bytes/sec.

SET LOW TAPE SPEED
(PARAMETERS COMMAND <A>)

Use this command to set the tape drive to low speed operation (usually 25 IPS).

Enter [A] at the COMMAND prompt. The program will display the message, SPEED SET TO LOW.

Some drives are not speed selectable and will only operate at one speed regardless of software speed selection. Low speed is selected when the program is first loaded.

Example:

COMMAND: [A] [ENTER]
SPEED SET TO LOW

COMMAND:

SET HIGH TAPE SPEED
(PARAMETERS COMMAND <B>)

Use this command to set the tape drive to high speed operation (usually 100 IPS).

Enter [B] at the COMMAND prompt. The program will display the message, SPEED SET TO HIGH.

High speed is not supported when the program is executed on an IBM PC/AT.

Example:

COMMAND: [B] [ENTER]
SPEED SET TO HIGH

COMMAND:

INTER-RECORD GAP:

Most tape drives default to the standard .6 inch gap. Using Flagstaff Engineering tape utilities, there is nothing to be gained by shifting to the long (approx 1.2 inch) gap. This affects only the write operation. The original intent of this option on a type drive is to allow the software more time to start the next write operation and still keep the drive in streaming mode.

SET SHORT INTER-RECORD GAP FOR WRITE (PARAMETERS COMMAND <C>)

Use this command to set short INTER-RECORD gaps for tape write operations. The program defaults to the short Inter-Record gap size when the program is first loaded. Use this command only if prior operations have been completed using a long Inter-Record gap size, and a short Inter-Record gap size is now required.

Enter [C] at the COMMAND: prompt. The program will display the message, SHORT INTER-RECORD GAP SET.,

Interrecord gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, Inter-Record gap commands will have no effect.

Example:

COMMAND: [C] [ENTER]

SHORT INTER-RECORD GAP SET

COMMAND:

SET LONG INTER-RECORD GAP
(PARAMETERS COMMAND <D>)

Use this command to set long Inter-Record gaps for tape write operations.

Enter [D] at the COMMAND: prompt. The program will display the message, LONG INTER-RECORD GAP SET.

Interrecord gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, Inter-Record gap commands will have no effect.

Example:

COMMAND: [D] [ENTER]

LONG INTER-RECORD GAP SET

COMMAND:
SET ERROR RETRY COUNT
(PARAMETERS COMMAND <E>)

Use this command to set the number of retries the program will perform when reading and writing to tape. The default count for retries is 16. This is normally adequate to recover from tape read/write errors. If data must be recovered from old or damaged tape, a higher retry count may enable the user to read data from the tape in question.

Enter [E] [xx] at the COMMAND: prompt.
The program will display the message,
RETRY COUNT SET TO XX.

Example:

COMMAND: [E] [22] [ENTER]

RETRY COUNT SET TO 22

COMMAND:

SET TAPE ADDRESS
(PARAMETERS COMMAND <F>)

Use this command to set the address of the tape drive being accessed by the program.

This defaults to zero which is the normal address for single tape drives. The address used by the software must agree with the address option set in the tape drive. The range of addresses supported is Ø to 7.

The command is normally used when more than one drive is interfaced to the system. A second drive would usually be at hardware address 1.

Enter [F] [x], where x equals the drive address. The program will display the message, ADDR CHANGED TO X.

Example:

COMMAND: [F] [1] [ENTER]

ADDR CHANGED TO 1

COMMAND:

TAPE DENSITIES:

Not all tape drives will respond to the set density command. For those with software selectable 3200/1600 bpi operation, these commands can be used to change the recording density.

SET 1600 BITS/INCH DENSITY
(PARAMETERS COMMAND <G>)

Use this command to change tape density to 1600 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 1600 BPI.

Enter [G] at the COMMAND: prompt. The program will display the message, DENSITY SET TO 1600 BPI, and then display the COMMAND: prompt.

Example:

COMMAND: [G] [ENTER]

DENSITY SET TO 1600 BPI

COMMAND:

SET 3200 BITS/INCH DENSITY
(PARAMETERS COMMAND <H>)

Use this command to change tape density to 3200 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 3200 BPI.

Enter [H] at the COMMAND: prompt. The program will display the message, DENSITY SET TO 3200 BPI, and then display the COMMAND: prompt.

Example:

COMMAND: [H] [ENTER]

DENSITY SET TO 3200 BPI

COMMAND:

SET MAXIMUM BUFFER SIZE FOR READ
(PARAMETERS COMMAND <I>)

Use this command to change the size of the maximum block size that can be read from tape. The default block size for tape read operations is 16K. For optimum program speed, the input buffer size should be set equal to or slightly greater than the actual block size found on the tape.

Enter [I] at the COMMAND: prompt followed by the number of bytes to be used for the input buffer. The program will display the message, MAXIMUM INPUT BLOCK SIZE SET TO XXXX, and then display the COMMAND: prompt.

Example:

COMMAND: [I] [4096] [ENTER]

MAXIMUM INPUT BLOCK SIZE SET TO 4096

COMMAND:

INSTAPE.EXE TAPEUTL INSTALLATION PROGRAM

This program will change screen colors used by the Flagstaff Engineering TAPEUTL or EXTRACT programs. No other parameters are changed and the display on monochrome monitors is not changed. In response to the request for 'NAME OF PROGRAM', enter the full program name, for example 'TAPEUTL.EXE'.

Colors are specified for three types of display:

Normal - Used for displaying most prompts, text, etc.
Enhanced - Used for operator entry fields & error messages
Reversed - Used to highlight selected data (EXTRACT only)

When a new color is requested, pressing return leaves it unchanged. The following color values should be used to indicate the desired display colors:

Ø = Black	8 = Dark grey
1 = Blue	9 = Light blue
2 = Green	1Ø = Light green
3 = Cyan	11 = Light cyan
4 = Red	12 = Light red
5 = Magenta	13 = Light magenta
6 = Brown	14 = Yellow
7 = Light grey	15 = Bright white

PROGRAM OPERATION:

Load INSTAPE.exe using the standard PC-DOS load syntax:

C> [INSTAPE] [ENTER]

The program will load and then display a description screen. The user will be prompted to press any key to continue, or cancel the program by entering [C].

Press any key to continue.

The program will prompt the user to enter the new normal screen background color. Enter a number from Ø to 7 and press [ENTER].

The program will prompt the user to enter a new normal screen foreground color. Enter a number from Ø to 15 and press [ENTER].

The program will prompt the user to enter the new enhanced screen background color. Enter a number from Ø to 7 and press [ENTER].

The program will prompt the user to enter a new enhanced screen foreground color. Enter a number from Ø to 15 and press [ENTER].

The program will prompt the user to enter the new reversed screen background color. Enter a number from Ø to 7 and press [ENTER].

The program will prompt the user to enter a new reversed screen foreground color. Enter a number from Ø to 15 and press [ENTER].

The program will display the colors as set, and prompt the user to accept or redo the color settings. Enter a [Y] to accept the color settings and end the program, or enter a [N] to reset the color settings.

EXAMPLE:

C>[INSTAPE] [ENTER]

Enter 'C' to cancel at this point, anything else to continue [ENTER]

NAME OF PROGRAM [TAPEUTL.EXE] [ENTER]

Normal - background = Ø foreground = 2

New background color (Ø - 7):
[2] [ENTER]

New foreground color (Ø - 15):
[7] [ENTER]

Enhanced - background = Ø foreground = 3

New background color (Ø - 7):
[Ø] [ENTER]

New foreground color (Ø - 15):
[3] [ENTER]

```
Reversed - background = 7  foreground = 1

New background color (Ø - 7):
[ENTER]

New foreground color (Ø - 15):
[ENTER]

Normal   - background = 2  foreground = 7
Enhanced - background = Ø  foreground = 3
Reversed - background = 7  foreground = 1

Is this ok? [Y] [ENTER]

Installation complete

C>
```

TAPEBKR DOS FILE BACKUP/RESTORE PROGRAM

Load TAPEBKR.EXE by using the standard PC-DOS load command syntax:

```
C> TAPEBKR
```

The program will load and then display a menu of commands. The Main Menu consists of the following commands:

BKUP	BACKUP DOS FILES TO NEW TAPE
EXT	APPEND FILES TO EXISTING BACKUP TAPE
REST	RESTORE DOS FILES FROM TAPE
REW	REWIND TO BEGINNING OF TAPE
RUN	REWIND AND UNLOAD THE TAPE
PARM	CHANGE SYSTEM PARAMETERS
ADDR	SET TAPE UNIT ADDRESS (DEFAULT=Ø)
<RETURN>	EXIT BACK TO DOS
?	REDISPLAY THIS MENU

Each of these commands will perform a specific operation, or display a sub-menu of operations for the process selected. Commands should be typed as listed in the menu, followed by [ENTER].

Pressing the [ENTER] key at the menu COMMAND: prompt will end the program and return the user to DOS.

Pressing the [?] key at the program COMMAND: prompt will redisplay the main menu.

(BKUP) BACKUP DOS FILES TO NEW TAPE

The Backup command is designed to copy PC-DOS files to a new tape. When this command is executed, the program initializes the tape by creating a directory file on the tape that contains file names and location data for files written to the tape. Once the command is exited, use the append (EXT) command to add more files to the backup tape. If the BKUP command is used on a tape already initialized as a Backup/Restore tape, all previous file entries will be lost. The command supports DOS directories, paths and wildcards. A maximum number of 1200 file entries is supported by the directory.

When the command is executed, the program will prompt the user to enter a comment line. The comment line will accept up to eighty characters and may be used for notes or comments describing the files the tape holds. This comment line will be displayed when the REST command is executed.

The program will then prompt the user to enter an input file name. A complete DOS file name may be entered, or the wildcard characters '*' and '?' may be used.

The command supports an archive option. The archive option is enabled by entering a plus sign (+) after the input file name. When the archive option is selected, the program will only copy files modified since the last backup operation. The program will clear the archive bit of each file copied to tape.

The archive function is useful when files have been backed up to another tape, and a wildcard is used in the input file name for a new tape. An example would be backing up all files with an extension of .TXT to a tape.

At a later date, several new files might have been created with the same extension. The BKUP command could be used to create a new backup tape specifying an input file name of *.TXT+. Only files that had been modified or created since the last backup would be written to the new tape.

After an input file name has been entered, the program will copy the indicated file(s) to tape, and display a copy complete message for each file copied.

After the copy operation is complete, the program will prompt the user to copy another file. More files may be copied to the tape, or the user may exit back to the main menu by pressing [ENTER].

Example:

```
COMMAND: [BKUP]

COMMENTS: [Text file backup]

INPUT FILE: [C:\TEXT\*.*]

COPY COMPLETE - C:\TEXT\LETTER.TXT
COPY COMPLETE - C:\TEXT\REPORT.TXT
COPY COMPLETE - C:\TEXT\REVIEW.TXT
.     .         . .       .
.     .         . .       .
COPY COMPLETE - APNOTE.TXT
```

```
INPUT FILE: [MYPROG.EXE]

COPY COMPLETE - MYPROG.EXE

INPUT FILE: [C:\ASM\MY????.*]

COPY COMPLETE - C:\ASM\MYPROG.ASM
COPY COMPLETE - C:\ASM\MYPROG.OBJ
COPY COMPLETE - C:\ASM\MYLIST.ASM
COPY COMPLETE - C:\ASM\MYLIST.OBJ

INPUT FILE: [ENTER]

COMMAND:
```

(EXT) APPEND FILES TO EXISTING BACKUP TAPE

The EXT command is designed to copy PC-DOS files to a Backup/Restore tape created by the BKUP command. When this command is executed, the program checks the tape directory created by the BKUP command to find the last file written to tape. The program will append new files to the tape and update the file directory.

The command supports DOS directories, paths and wildcards. A maximum number of 1200 file entries is supported by the directory.

When the command is executed, the program will prompt the user for an input file. A complete DOS file name may be entered, or the wildcard characters '*' and '?' may be used.

The command supports an archive option. The archive option is enabled by entering a plus sign (+) after the input file name. When the archive option is selected, the program will only copy files modified since the last backup operation. The program will clear the archive bit of each file copied to tape. This is useful when files have been previously backed up to tape with a wildcard in the input file name. An example would be backing up all files with an extension of .TXT to a tape. At a later date, several new files might have been created with the same extension. The EXT command could be used to append new files to the tape by specifying an input file name of *.TXT+. Only files that had been modified or created since the last backup would be appended.

After an input file name has been entered, the program will copy the indicated file(s) to tape, and display a copy complete message for each file copied.

After the copy operation is complete, the program will prompt the user to copy another file. More files may be copied to the tape, or the user may exit back to the main menu by pressing [ENTER].

Example:

```
COMMAND: [EXT]
ANY COMMENTS ENTERED WHEN TAPE WAS CREATED
BACKUP DATE XX/XX/XX
LOGICAL END OF TAPE FOUND
INPUT FILE: [C:\TEXT\*.*]
COPY COMPLETE - C:\TEXT\LETTER.TXT
COPY COMPLETE - C:\TEXT\REPORT.TXT
COPY COMPLETE - C:\TEXT\REVIEW.TXT
.     .       . .     .
.     .       . .     .
COPY COMPLETE - APNOTE.TXT
INPUT FILE: [MYPROG.EXE]
COPY COMPLETE - MYPROG.EXE
INPUT FILE: [C:\ASM\MY????.*]
COPY COMPLETE - C:\ASM\MYPROG.ASM
COPY COMPLETE - C:\ASM\MYPROG.OBJ
COPY COMPLETE - C:\ASM\MYLIST.ASM
COPY COMPLETE - C:\ASM\MYLIST.OBJ
INPUT FILE: [ENTER]
COMMAND:
```

(REST) RESTORE DOS FILES FROM TAPE

The RESTORE command is designed to copy backed up PC-DOS files on tape to DOS volumes on hard disk or diskette. The tape files to be copied to disk or diskette must have been created using the BKUP or EXT main menu commands. The command supports DOS directories, path and wildcards.

When the command is executed, the program will display a sub-menu of the following commands:

DIR	Display index of files on the tape.
COPY	Copy file(s) from tape to DOS.
<RETURN>	Return to main menu.
?	Redisplay sub-menu.

DIR COMMAND:

Use the DIR command to display the directory of files on the tape. This command will only display a file directory created by the BKUP command. Each file stored on the tape will be displayed on a file information line containing file number, location, number of blocks used, creation date, and file name. File names and wildcard characters may be used with the DIR command to display a specific range of files.

The file numbers and file names displayed by the DIR command may be used with the COPY command to restore a file to hard disk or diskette.

COPY COMMAND:

Use the COPY command to restore tape files to a DOS volume on hard disk or diskette. To copy files from tape to disk, enter: [COPY <source file> <target file>]

The source file parameter may be entered as:

File number.
  [COPY 2]
Range of file numbers separated by a dash.
  [COPY 3-15]
File name.
  [COPY MYFILE.DAT]
File name with wildcard.
  [COPY MY????.*]

The target file parameter may be entered as:

Default to volume TAPEBKR was loaded from.
  [COPY MYFILE.DAT]
DOS Path and Subdirectory.
  [COPY MYFILE.DAT C:\TEMP\]

Example:

COMMAND: [REST] [ENTER]

DIR	DISPLAY INDEX OF FILES ON TAPE
COPY	COPY FILES FROM TAPE TO DOS
<RETURN>	RETURN TO MAIN MENU
?	REDISPLAY THIS MENU

```
COMMAND: [DIR]
FILE# LOC   BLOCKS    DATE      FILE NAME

1      2      1     XX/XX/XX   LETTER.TXT
2      2      1     XX/XX/XX   REPORT.TXT
3      3     13     XX/XX/XX   REVIEW.TXT
4      4      7     XX/XX/XX   APNOTE.TXT
5      5     21     XX/XX/XX   MYPROG.EXE
6      6     19     XX/XX/XX   MYPROG.ASM
7      7      3     XX/XX/XX   MYPROG.OBJ
8      8     14     XX/XX/XX   MYLIST.ASM
9      9      6     XX/XX/XX   MYLIST.OBJ

COMMAND: [COPY *.TXT C:\WORK\]
COPY COMPLETE - C:\WORK\LETTER.TXT
COPY COMPLETE - C:\WORK\REPORT.TXT
COPY COMPLETE - C:\WORK\REVIEW.TXT
COPY COMPLETE - C:\WORK\APNOTE.TXT

COMMAND: [COPY 5-7 C:\]
COPY COMPLETE - C:\MYPROG.EXE
COPY COMPLETE - C:\MYPROG.ASM
COPY COMPLETE - C:\MYPROG.OBJ

COMMAND: [COPY MYLIST.ASM C:\NEWLIST.ASM]
COPY COMPLETE - C:\MYLIST.ASM
COMMAND: [ENTER]
COMMAND: [?] [ENTER]
BACKUP/RESTORE COMMANDS -
   .
   .
   .
```

(REW) REWIND TAPE

Use this command to rewind the tape back to the tape load point (the Load Point is indicated by the reflective strip at the beginning of the tape).

Enter [REW]. The program will rewind the tape to the load point. The program will display, TAPE AT LOAD POINT, and then display the PARM sub-menu command prompt.

Example:

COMMAND: [REW]

TAPE IS AT LOAD POINT

COMMAND:

(RUN) REWIND AND UNLOAD TAPE

Use this command to completely rewind and unload the tape from the drive.

Enter [RUN]. The program will rewind and unload the tape on the drive. The program will display, TAPE UNLOADED, and then display the PARM sub-menu command prompt.

Example:

COMMAND: [REW]

TAPE UNLOADED

COMMAND:

(PARM) SYSTEM PARAMETER SUB-MENU COMMANDS

The PARM command is designed to allow program operation parameters to be changed by the user.

When the command is executed, the program will display a sub-menu of the following commands:

SLOW	Set tape speed to 25 IPS (Default).
SHIGH	Set high tape speed.
LRG	Set long inter-record gap for write operations.
SRG	Set short inter-record gap for write operations (Default).
TRYS	Set retries for write and read errors (Default=16).
ADDR	Set tape unit address (default = Ø).
SET32	Set 32ØØ Bits/Inch density.
SET16	Set 16ØØ Bits/Inch density.
<RETURN>	Return to Main Menu.
?	Redisplay this menu.

SLOW COMMAND:

Use this command to set the tape drive speed to 25 IPS.

Enter [SLOW]. The program will display the message, SPEED SET TO LOW, and then display the PARM sub-menu command prompt.

25 IPS is the default speed when the program is first loaded. 25 IPS is the only speed supported when the program is executed on an IBM PC/AT.

Example:

COMMAND: [SLOW]

SPEED SET TO 25 IPS

COMMAND:

SHIGH COMMAND:

Use this command to set the tape speed to 100 IPS.

Enter [SHIGH]. The program will display the message, SPEED SET TO HIGH, and then display the PARM sub-menu command prompt.

Example:

COMMAND: [SHIGH]

SPEED SET TO 100 IPS

COMMAND:

LRG COMMAND:

Use this command to set long inter-record gaps for tape write operations.

Enter [LRG]. The program will display the message, LONG INTER-RECORD GAP SET, and then display the PARM sub-menu command prompt.

Inter-record gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, inter-record gap commands will have no effect.

Example:

COMMAND: [LRG]

LONG INTER-RECORD GAP SET

COMMAND:

SRG COMMAND:

Use this command to set short inter-record gaps for tape write operations. The program defaults to the short inter-record gap size when the program is first loaded. Use this command only if prior operations have been completed using a long inter-record gap size, and a short inter-record gap size is now required.

Enter [SRG]. The program will display the message, SHORT INTER-RECORD GAP SET, and then display the PARM sub-menu command prompt.

Inter-record gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, inter-record gap commands will have no effect.

Example:

COMMAND: [SRG]

SHORT INTER-RECORD GAP SET

COMMAND:

TRYS COMMAND:

Use this command to set the number of retries the program will perform when reading and writing to tape.

Enter [TRYS]. The program will display the message, ENTER NEW TRY COUNT (DEFAULT IS 16):, and wait for input.

Enter the number of retries required and press [ENTER]. The program will display the PARM sub-menu command prompt.

Example:

COMMAND: [TRYS]

ENTER NEW TRY COUNT
(DEFAULT IS 16): [24] [ENTER]

COMMAND:

(ADDR) SET TAPE UNIT ADDRESS
(DEFAULT = Ø)

Use this command to set the physical address of the tape drive being accessed by the program.

Enter [ADDR X], where X equals the drive address. The program will display the message, ADDR CHANGED TO X, and then display the PARM sub-menu command prompt.

This command is normally required only if more than one drive is interfaced to the system. The default drive address is Ø when the program is loaded. A second drive would usually be at address 1.

Example:

COMMAND: [ADDR 1]

ADDR CHANGED TO 1

COMMAND:

SET32 COMMAND:

Use this command to change tape density to 3200 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 3200 BPI.

Enter [SET32]. The program will display the message, DENSITY SET TO 3200 BPI, and then display the PARM sub-menu prompt.

Example:

COMMAND: [SET32]

DENSITY SET TO 3200 BPI

COMMAND:

SET16 COMMAND:

Use this command to change tape density to 1600 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 1600 BPI.

Enter [SET16]. The program will display the message, DENSITY SET TO 1600 BPI, and then display the PARM sub-menu command prompt.

Example:

COMMAND: [SET16]

DENSITY SET TO 1600 BPI

COMMAND:

TAPEDUP.EXE

TAPEDUP is a program designed to duplicate files from a source unlabeled or labeled tape to a second target tape. Two tape drives are required to operate the program. The source tape drive is at drive address Ø. The target drive is at drive address 1.

The program may be copied to and executed from any diskette or hard disk volume desired.

To load the tape duplication program, use the standard PC-DOS load command syntax:

C>[TAPEDUP] [ENTER]

After the program has loaded, a copyright message will be displayed. The program will then calculate the amount of unused memory available in the system and allocate this memory as a work buffer.

The TAPEDUP program may be aborted by pressing [CTRL] [C]. Occasionally, the Control-C sequence may not successfully terminate the program. If this occurs, press [CTRL] [BREAK] to end the program.

This procedure is only recommended as a last resort, since data in the work buffer will be lost while the program is doing a read or write operation to tape.

The program will prompt the user to select high speed. Enter a [Y] to select high speed operation, or enter an [N] or press the [ENTER] key to select low speed operation. If high speed operation is selected, the program will attempt to set the high speed line of the formatter in each tape drive. On single speed drives such as Qualstars, this signal will be ignored.

The program will prompt the user to verify that the master tape is mounted on drive Ø, and that a scratch target tape is mounted on drive 1. Confirm that tapes are mounted on the drives and press [ENTER].

The program will read data blocks from the tape until the work buffer is filled, and then write the data blocks to the target tape. As the process repeats, the program will display number of blocks read and written. The copy operation will terminate when the logical end of tape is found. The program will display the number of blocks and size in bytes of each file copied, and then return the user to DOS.

Example:

C>[TAPEDUP] [ENTER]

THIS PROGRAM COPIES ONE TAPE COMPLETELY TO ANOTHER.

THE TAPE ON DRIVE Ø IS COPIED TO DRIVE 1.
COPYRIGHT FLAGSTAFF ENGINEERING XX/XX/XX

SET HIGH SPEED (N/Y)? [ENTER]

```
BE SURE THE MASTER TAPE IS MOUNTED ON
DRIVE Ø AND THAT A SCRATCH TAPE IS MOUNTED
ON DRIVE 1

THEN PRESS RETURN TO CONTINUE... [ENTER]

BLOCK XXXXX TO XXXXX READ
BLOCK XXXXX TO XXXXX WRITTEN

FILE ØØØ1 COPY COMPLETE
1ØØ BLOCKS 8ØØØ BYTES

BLOCK XXXXX TO XXXXX READ
BLOCK XXXXX TO XXXXX WRITTEN

FILE ØØØ2 COPY COMPLETE
5ØØ BLOCKS 2ØØØØ BYTES

C>
```

TAPETEST.EXE

The Flagstaff Engineering Tape Test program is a menu driven program that allows the user to test the operation of the tape sub-system.

To load the Tape Utility program, use the standard PC-DOS load command syntax:

```
A:TAPETEST
```

After the program has loaded, a copyright message will be displayed. The program will then calculate the amount of unused memory available in the system and allocate this memory as a work buffer. The work buffer size will be displayed with the message, 'MEMORY BUFFER SIZE = XXXXXX'.

The program then displays the main menu of commands.

MENU COMMANDS:

TST	TEST TAPE INSTALLATION
EXE	EXERCISE TAPE READ/WRITE FUNCTIONS
PARM	CHANGE SYSTEM PARAMETERS
<RETURN>	EXIT BACK TO DOS
?	REDISPLAY THIS MENU

Each of these commands will perform a specific operation. Commands should be typed as listed in the menu, followed by the [ENTER] key.

Press [?] at any COMMAND: prompt to redisplay the menu commands.

The program may be exited at any COMMAND: prompt by pressing the [ENTER] key. The program will end and the DOS prompt will be displayed.

The PARM command will display a sub menu of parameter setting functions. Pressing the [ENTER] key when in the PARM sub menu will return the user to the main menu COMMAND: prompt. Pressing the [?] key will redisplay the PARM sub menu.

TST TAPE SYSTEM TEST

This command initiates a software test of the tape system to confirm correct system operation. This command should be used to verify system operation after a tape subsystem is installed, or to identify suspected problems in an installed system.

Enter [TST] followed by the [ENTER] key. The program will prompt the user to verify the following:

1. Scratch tape with a write enable ring is mounted in the drive.
2. Tape is positioned at load point.
3. Tape on-line switch on the drive is enabled.

Verify that the conditions are true, and press [ENTER].

The program will write fifty blocks of 10000 bytes to tape. The program will then rewind the tape and perform a read operation to verify the written data. On completion of the test, the program will display the message, ALL TESTS SUCCESSFUL. The COMMAND: prompt will then be displayed.

If error conditions occur, the program will display an error message and terminate the test procedure.

Example:

COMMAND: [TST] [ENTER]

THIS PROCEDURE INCLUDES WRITING DATA OUT TO TAPE AND READING IT BACK

```
BE SURE YOU ARE USING A SCRATCH TAPE WHICH
CONTAINS NO VALUABLE DATA!

PLEASE VERIFY THE FOLLOWING:
- THESE IS A SCRATCH TAPE MOUNTED WITH A
  WRITE ENABLE RING INSERTED
- THE TAPE IS POSITIONED AT LOAD POINT
- THE ONLINE SWITCH HAS BEEN ENABLED

...THEN PRESS RETURN<RETURN>

WRITING 5Ø BLOCKS OF 1ØØØØ BYTES
BLOCK XX

TAPE IS REWINDING PLEASE WAIT ...

TAPE IS AT LOAD POINT

READING 1ØØØØ BYTE BLOCKS
BLOCK XX LENGTH XXXXX

ALL TESTS SUCCESSFUL

COMMAND:
```

EXE EXERCISE TAPE READ/WRITE OPERATIONS

The EXE command is similar to the TST command in that the program writes a specific number of data blocks to tape, and then read verifies the data blocks to confirm data integrity. EXE allows the user to either enter the block size and total number of blocks to write to tape, or to choose a repeating test sequence that will execute until canceled.

Enter [EXE]. The program will prompt the user to verify the following:

1. Scratch tape with a write enable ring is mounted in the drive.
2. Tape is positioned at load point.
3. Tape on-line switch on the drive is enabled.

Verify that the conditions are true, and press [ENTER].

The program will prompt the user to select manual or automatic testing. The manual test operation allows the user to select block size and the total number of blocks to be written to tape. The automatic test operation will write and read a sequence of block sizes ranging from 500 bytes to 10000 bytes. When automatic operation is selected, the test will continue to run until canceled by pressing the [C] key.

Enter an [A] for automatic testing, or enter an [M] or press the [ENTER] key to select manual testing.

Manual Test:

The manual test option will prompt the user to enter the data block size to write to tape. Enter a number from 1 to 63356 and press [ENTER].

The program will prompt the user to enter the number of blocks to write to tape. Enter a number from 1 to 99999 and press [ENTER].

The program will write the indicated number of blocks to tape. The program will then rewind the tape and perform a read operation to verify the written data. On completion of the test, the program will display the message, ALL TESTS SUCCESSFUL, and display the main menu command prompt.

If error conditions occur, the program will display an error message and terminate the test procedure.

Automatic Test:

The automatic test option will BEGIN execution immediately after being selected.

The program will write 500 blocks that are 100 bytes in length to tape. The program will then rewind the tape and perform a read operation to verify the written data. The program will then repeat the read/write test with various block sizes. The largest block size used is 10,000 bytes. The program will completely fill the tape with 10,000 byte blocks, and then perform a read verify. This test sequence will continue until the test is cancelled by pressing the [C] key.

If error conditions occur, the program will display an error message and terminate the test procedure.

Example:

```
COMMAND: [EXE] [ENTER]

THIS PROCEDURE INCLUDES WRITING DATA OUT
TO TAPE AND READING IT BACK
BE SURE YOU ARE USING A SCRATCH TAPE WHICH
CONTAINS NO VALUABLE DATA!

BE SURE THERE IS A SCRATCH TAPE MOUNTED
WITH A WRITE ENABLE RING INSERTED
THEN PRESS <RETURN> TO CONTINUE
OR 'C' TO CANCEL

MANUAL OR AUTOMATIC TEST? (M/A):
[M] [ENTER]

BLOCK SIZE: [500] [ENTER]

NUMBER OF BLOCKS: [1000] [ENTER]

WRITING 1000 BLOCKS OF 500 BYTES
BLOCK XX

TAPE IS REWINDING PLEASE WAIT ...

TAPE IS AT LOAD POINT

READING 500 BYTE BLOCKS
BLOCK XX LENGTH XXXXX

ALL TESTS SUCCESSFUL

COMMAND:
```

PARM CHANGE SYSTEM PARAMETERS

The tape system parameter option is designed to allow program operation parameters to be changed by the user.

When the command is executed, the program will display a sub menu of the following commands:

SLOW	SET LOW TAPE SPEED
SHIGH	SET HIGH TAPE SPEED
LRG	SET LONG INTER-RECORD GAP FOR WRITE
SRG	SET SHORT INTER-RECORD GAP FOR WRITE (DEFAULT SETTING)
TRYS	SET ERROR RETRY COUNT (DEFAULT = 16)
ADDR	SET TAPE ADDRESS (Ø = DEFAULT)
SET32	SET 32ØØ BITS/INCH DENSITY
SET16	SET 16ØØ BITS/INCH DENSITY (DEFAULT SETTING)
<RETURN>	TO GO BACK TO MAIN MENU
?	REDISPLAY THIS MENU

TAPE SPEED:

Not all tape drives will respond to speed change commands. The speed at which the tape drive is operating at power up may be dependent on dip switch or jumper options which are set on the tape drive. Do not attempt to operate an IBM/AT with a data rate above 1ØØk bytes/sec. On a 16ØØ bpi tape a speed of 5Ø inches per second produces a data rate of 8Øk bytes/sec.

SLOW - SET LOW TAPE SPEED

Use this command to set the tape drive to low speed operation (usually 25 IPS).

Enter [SLOW] at the COMMAND: prompt. The program will display the message, SPEED SET TO LOW.

Some drives are not speed selectable and will only operate at one speed regardless of software speed selection. Low speed is selected when the program is first loaded.

Example:

COMMAND: [SLOW] [ENTER]

SPEED SET TO LOW

COMMAND:

SHIGH - SET HIGH TAPE SPEED

Use this command to set the tape drive to high speed operation (usually 100 IPS).

Enter [SHIGH] at the COMMAND: prompt. The program will display the message, SPEED SET TO HIGH.

High speed is not supported when the program is executed on an IBM PC/AT.

Example:

COMMAND: [SHIGH] [ENTER]

SPEED SET TO HIGH

COMMAND:

INTER-RECORD GAP:

Most tape drives default to the standard .6 inch gap. Using Flagstaff Engineering tape utilities, there is nothing to be gained by shifting to the long (approx 1.2 inch) gap. This affects only the write operation. The original intent of this option on a type drive is to allow the software more time to start the next write operation and still keep the drive in streaming mode.

LRG - SET LONG INTER-RECORD GAP

Use this command to set long Inter-Record gaps for tape write operations.

Enter [LRG] at the COMMAND: prompt. The program will display the message, LONG INTER-RECORD GAP SET.

Inter-Record gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, Inter-Record gap commands will have no effect.

Example:

COMMAND: [LRG] [ENTER]

LONG INTER-RECORD GAP SET

COMMAND:

SRG - SET SHORT INTER-RECORD GAP FOR WRITE

Use this command to set short INTER-RECORD gaps for tape write operations. The program defaults to the short Inter-Record gap size when the program is first loaded. Use this command only if prior operations have been completed using a long Inter-Record gap size, and a short Inter-Record gap size is now required.

Enter [SRG] at the COMMAND: prompt. The program will display the message, SHORT INTER-RECORD GAP SET.

Inter-Record gap size can be set on tape drives that allow software selection of gap size. On drives that have the gap size permanently selected, Inter-Record gap commands will have no effect.

Example:

COMMAND: [SRG] [ENTER]

SHORT INTER-RECORD GAP SET

COMMAND:

TRYS - SET ERROR RETRY COUNT

Use this command to set the number of retries the program will perform when reading and writing to tape. The default count for retries is 16. This is normally adequate to recover from tape read/write errors. If data must be recovered from old or damaged tape, a higher retry count may enable the user to read data from the tape in question.

Enter [TRYS] [xx] at the COMMAND: prompt. The program will display the message, RETRY COUNT SET TO XX.

Example:

COMMAND: [TRYS] [22] [ENTER]

RETRY COUNT SET TO 22

COMMAND:

ADDR - SET TAPE ADDRESS

Use this command to set the address of the tape drive being accessed by the program.

This defaults to zero which is the normal address for single tape drives. The address used by the software must agree with the address option set in the tape drive. The range of addresses supported is Ø to 7.

The command is normally used when more than one drive is interfaced to the system. A second drive would usually be at hardware address 1.

Enter [ADDR] [x], where x equals the drive address. The program will display the message, ADDR CHANGED TO X.

Example:

COMMAND: [ADDR] [1] [ENTER]

ADDR CHANGED TO 1

COMMAND:

TAPE DENSITIES:

Not all tape drives will respond to the set density command. For those with software selectable 3200/1600 bpi operation, these commands can be used to change the recording density.

SET32 - SET 3200 BITS/INCH DENSITY

Use this command to change tape density to 3200 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 3200 BPI.

Enter [SET32] at the COMMAND: prompt. The program will display the message, DENSITY SET TO 3200 BPI, and then display the PARM sub menu prompt.

Example:

COMMAND: [SET32] [ENTER]

DENSITY SET TO 3200 BPI

COMMAND:

SET16 - SET 1600 BITS/INCH DENSITY

Use this command to change tape density to 1600 BPI. This command should only be used with tape drives that have selectable densities, or on drives permanently optioned to 1600 BPI.

Enter [SET16] at the COMMAND: prompt. The program will display the message, DENSITY SET TO 1600 BPI, and then display the PARM sub menu command prompt.

Example:

COMMAND: [SET16] [ENTER]

DENSITY SET TO 1600 BPI

COMMAND:

TAPE BENCH MARK DATA TRANSFER RATES

The Flagstaff Engineering tape subsystem was used with various tape drives to measure data transfer rates both to and from tape. All tests were run using a 3 megabyte test file on machines with 512k of memory. Data was transferred to and from hard disk. Tape density selected was usually 1600 bpi. The test file was transferred as 30,000 records. Each record was 100 bytes in length. These times are provided as an aid for application planning and system implementation.

A. IBM/AT TRANSFER RATES:

Tape Drive	Block Size	Output Time	Input Time
Qualstar (50 ips)	1K	1:52	1:57
	10K	1:15	1:22
Digidata (25 ips)	1K	3:04	3:08
	10K	1:50	1:55
Anritsu 2000 (25 ips)	1K	3:04	3:09
	10K	1:53	1:58
Cipher 880 (25 ips)	1K	3:06	3:10
	10k	1:50	1:54
Cipher 990	1K	1:24	1:24
(90.4 kb/sec)	10K	1:05	1:11
Cipher 990 6250 bpi	1K	1:25	1:27
(90.4 kb/sec)	10K	1:05	1:12

B. IBM/XT TRANSFER RATES:

Tape Drive	Block Size	Output Time	Input Time
Qualstar (50 ips)	1K	2:13	2:22
	10K	1:37	1:45
Digidata (25 ips)	1K	3:26	3:32
	10K	2:10	2:18
Digidata (100 ips)	1K	1:32	1:40
	10K	1:11	1:18
Anritsu 2000 (25 ips)	1K	3:25	3:32
	10K	2:13	2:21
Cipher 880 (25 ips)	1K	3:27	3:34
	10k	2:11	2:18
Cipher 990	1K	1:33	1:37
(158.2 kb/sec)	10K	1:10	1:17

C. AT&T 6300 PLUS TRANSFER RATES

Tape Drive	Block Size	Output Time	Input Time
Qualstar (50 ips)	1K	1:52	1:57
	10K	1:15	1:20
Digidata (25 ips)	1K	3:08	3:08
	10K	1:51	1:53
Anritsu 2000 (25 ips)	1K	3:04	3:06
	10K	2:03	1:57
Cipher 880 (25 ips)	1K	3:08	3:10
	10k	1:55	1:54
Cipher 990	1K	1:26	1:27
(90.4 kb/sec)	10K	1:06	1:10